Volume 22 Study G-I-P

STATE OF ALASKA

Jay S. Hammond, Governor

Annual Performance Report for

INVENTORY AND CATALOGING OF SPORT FISH AND SPORT FISH WATERS OF WESTERN ALASKA

by

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RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations of Alaska

Project No.: F-9-13

Study No.: G-I Study Title: INVENTORY AND CATALOGING

Job No.: G-I-P Job Title: Inventory and Cataloging of Sport Fish and Sport Fish Waters of Western Alaska

Cooperator: Kenneth T. Alt

Period Covered: July 1, 1980 to June 30, 1981

ABSTRACT

Stream surveys of the Melozitna and Andreafsky Rivers indicated presence of Arctic char, Salvelinus alpinus (Linnaeus), Arctic grayling, Thymallus arcticus (Pallas), and northern pike, Esox lucius (Linnaeus). The lower Melozitna also contains sheefish, Stenodus leucichthys (Güldenstadt). The Melozitna River represents the farthest upstream distribution of Arctic char in the Yukon River system. Life history studies of species captured indicated parameters similar to other lower Yukon River streams. A 3-year survey of the fishes of the Fish-Niukluk River system was begun with collection of data from the upper Niukluk River.

Arctic char spawning ground counts on Grayling Creek, tributary to the Kivalina River, were lower in 1980 than in 1978 but considerably higher than the low numbers reported for 1979. Wulik River spawning char counts are presented. In 1980 char were also spawning in Sheep Creek and Ikalukrok Creek. Preliminary investigations were conducted for a 4-year Arctic char study scheduled to begin in 1981. Spawning streams in the Wulik-Kivalina, Noatak and Kobuk River drainages were flown. Char were tagged in Grayling Creek, Wulik River, Sheep Creek, Kelly River, Omar River and Wrench Creek. Overwintering char counts in the Wulik and Kivalina Rivers gave expanded counts of 124,908 in the Wulik River and 43,661 fish in the Kivalina River. These are similar to the 1979 counts.

BACKGROUND

Catalog and inventory studies during 1979 concentrated on the lower Yukon River and were to include streams from Nulato to downstream St. Marys. The Andreafsky River at St. Marys could not be surveyed in 1979 but was com-

pleted in June of 1980. With the completion of the Melozitna River survey (this report), all major tributaries of the Yukon River have been surveyed. These surveys, carried out from 1967 through 1980, were only of a cursory nature for some streams (e.g. Tozitna, Dall Rivers), or of a more detailed nature for other streams (e.g. Anvik, Charley, Chatanika Rivers). Results of the earlier surveys (1967-1977) were published under Study R-II (a Sheefish and Whitefish Life History Study in Alaska).

Survey work in the Nome-Seward Peninsula area has concentrated on important streams in the immediate Nome vicinity. These surveys and life history studies were completed in 1979. Emphasis will now shift to other important Seward Peninsula streams, especially those on the road system such as the Fish-Niukluk, Sinuk and Snake Rivers. The Fish-Niukluk is a very important fishing stream, especially for Nome residents. With the completion of the bridge over Safety Sound, more and more people can be expected to utilize the Fish-Nuikluk Rivers. One fishing guide is presently operating on the system. Some Nome residents fly to Council then boat down the Niukluk to fish.

Because of manpower limitations, our Fish-Niukluk survey will consist of completing a portion of the streams during each of the next 3 to 4 years. Emphasis will be on grayling, Arctic char and coho salmon, Oncorhynchus kisutch (Walbaum). With the completion of the Yukon River surveys, emphasis of the catalog and inventory study will switch to a 4-year Arctic char study in Northwest Alaska. Mineral exploration work, possible conflicts of use by three user groups, and a paucity of life history information on this species make it imperative that a large scale program be initiated as soon as possible. Although char will be of primary importance, physical data on all streams in the area as well as life history information on other species will be collected. Preliminary survey work was conducted on the Wulik-Kivalina, Noatak and Kobuk Rivers in 1980. The encouraging results of these surveys will help us set up a solid 4-year research study. A major emphasis will be on determining system interchange. Information on utilization will also be collected.

Scientific and common names of fish captured are presented in Table 1.

RECOMMENDATIONS

Research

1. The major research effort in 1981 should be directed toward the Northwest Alaska char study.

2. The Fish-Niukluk survey should continue as time permits.

Management

1. Monitoring of the sport and subsistence char harvest in the Northwest Alaska area should be conducted.

Table 1. List of common names, scientific names and abbreviations of fish found in study area.

Common Name	Scientific Name & Author	Abbreviation
Alaska blackfish	Dallia pectoralis Bean	BF
Arctic char	Salvelinus alpinus (Linnaeus)	AC
Arctic grayling	Thymallus arcticus (Pallas)	GR
Arctic lamprey	Lampetra japonica (Martens)	AL
Broad whitefish	Coregonus nasus (Pallas)	BWF
Burbot	Lota lota (Linnaeus)	BB
Chinook salmon	Oncorhynchus tshawytscha (Walbaum)	KS
Coho salmon	Oncorhynchus kisutch (Walbaum)	SS
Dolly Varden	Salvelinus malma (Walbaum)	DV
Humpback whitefish	Coregonus pidschian (Gmelin)	HWF
Inconnu (sheefish)	Stenodus leucichthys (Güldenstadt)	SF
Least cisco	Coregonus sardinella Valenciennes	LCI
Longnose sucker	Catostomus catostomus Forster	LNS
Northern pike	Esox lucius Linnaeus	NP
Pink salmon	Oncorhynchus gorbuscha (Walbaum)	PS
Rainbow trout	Salmo gairdneri Richardson	RT
Round whitefish	Prosopium cylindraceum (Pallas)	RWF
Slimy sculpin	Cottus cognatus Richardson	SSC

2. Nome area salmon utilization should be monitored as time permits.

OBJECTIVES

1. To begin a physical-biological survey of the Fish-Niuluk Rivers.

2. To conduct a basic stream survey of the lower Melozitna River.

3. To collect angler and subsistence use information on important sport fish species in waters of the job area with emphasis on the Wulik and Kivalina Rivers.

TECHNIQUES USED

The Melozitna River was surveyed using a 12' inflatable raft for travel from Melozi Hot Springs Creek to the mouth of the Melozitna. Fish were captured mainly by hook and line but some were taken by gill net. Tributary streams were surveyed on foot. The Andreafsky River was surveyed by boat from St. Marys upstream to 3 mi beyond Allen Creek. Fish were captured by gill-netting, seining and hook and line angling in various habitats. Scales were collected for aging grayling, whitefish and pike. Cleithrum bones were also used for pike aging. Bones were cleaned of all excess tissue before reading and then stored dry. Bones were read either without aid of magnification or under low magnification using reflected light. Char were aged using otoliths. Pyloric caeca and gill rakers were collected in the field then counted in the laboratory.

For purposes of stream surveys, streams were divided into sections based upon physical characteristics of each section.

Grayling Creek Arctic char spawning counts were made by walking the stream and counting redds and spawning fish. The stream was walked a second time because high wind conditions during the first try made it difficult to observe fish.

Fish counts were made by fixed wing aircraft.

FINDINGS

Physical Aspects of Andreafsky and Melozitna Rivers

Andreafsky River:

The Andreafsky River originates about 20 mi south of the south coast of Norton Sound in the vicinity of Iprugalet Mountain. It flows southwesterly for 105 mi, entering the lower Yukon River at 63° 2'N, 163° 15' W near the village site of Old Andreafsky. The present community of St. Marys is

located on the Andreafsky River about 3½ mi from its mouth. The Andreafsky River is a mountain type clear system draining an area of 1,360 sq mi and includes as a major tributary the East Fork Andreafsky River, which drains an additional 835 sq mi. The mainstem Andreafsky and the East Fork are both confined to single channels and drain parallel long narrow mountain valleys which include numerous small clear tributary streams flowing from the valley sides. The river flows through a narrow band of patchy spruce and cottonwood forest interspersed with willow stands and tundra banks. At several locations steep schist cut banks extend to the water's edge. The mainstem Andreafsky was surveyed by riverboat to a point about 7 mi above the mouth of Allen Creek during the period from June 11 through June 14, 1980.

Other than a cabin located about 37 river mi upstream from the mouth and a camp at 42 Mile, there is little sign of human use. Local residents of St. Marys indicate that a limited amount of sport fishing goes on each summer but that most of the effort is confined to the lower 25 mi of the river because boat travel in summer is limited by low water conditions. One air taxi flies a few anglers each year into his camp located at 42 Mile. Locals also indicated that one or two groups have floated the river in each of the last few years. These are usually flown to gravel bars near the headwaters by a local air taxi.

The Andreafsky River was divided into two sections for survey purposes. Section I extends from the mouth to a point 15½ mi upstream where gravel is first encountered in the stream bed. This lower section meanders through tundra bog in long, wide, slow bends and contains some fairly extensive slough networks. Bank vegetation is mostly tundra with a few willows, and banks are mud and silt. In three net nights using 125' graduated mesh nets, two net nights using a 25' 2 1/4" bar measure net and one net night with a 50' 1/2" bar measure net, catches in this section were: 1 least cisco, 1 grayling, 6 humpback whitefish, 3 chum salmon 2 broad whitefish, and 4 northern pike (Table 2). Arctic char were captured by hook and line and round whitefish by seine. Blackfish, lampreys and sculpins were found in pike stomachs.

Water throughout this section was somewhat turbid, which precluded fish observation. Water temperature was 7.5°C. No hook and line fishing was attempted in this section but locals say that, during low water conditions, Arctic char and grayling can be sport caught in the upper reaches of Section I. St. Marys residents conduct a winter subsistence fishery for pike and whitefish in the lower reaches of this section.

Section II extends from the point of first gravel at 15 1/2 mi upstream. Our survey was terminated at approximately Mile 57 of the river, and the same stream characteristics extended beyond this point, therefore we could not give an upper boundary to this section. Excellent habitat for grayling and Arctic char is found in the mainstem of the river and in tributary streams. There are also some deadwater sloughs and beaver sloughs which afford excellent northern pike habitat. The major tributaries in the part of this section surveyed are Cottonwood Creek, which enters from the east at Mile 46, and Allen Creek, which enters from the west at Mile 50. Water

Table 2. Catch statistics - Andreafsky River by graduated mesh gill net, June 10-15, 1980.

Location	Species Captured					
	CS	HWF	BWF	LCI	GR	NP
1/4 Mile E. Fork Andreafsky River				1	1	
Lower Andreafsky River Slough	2	4				2
Lower Andreafsky River	1	1	2			
Andreafsky River & Allen Creek					6	1
Andreafsky River near Cottonwood Creek					2	4
25 Mile Andreafsky River			2		2	11

in this section was high but fairly clear, its temperature was 7°C and the water level was dropping at a rate of 4-5 in per day.

Three net nights of fishing a 125' graduated mesh gill net and two net nights of fishing a 50' 1/2" bar measure gill net yielded: 24 northern pike, 14 grayling and 2 broad whitefish. Three seine hauls with a 50' 1/4" seine yielded 10 round whitefish and 2 grayling. Angling for 1.5 hrs yielded eight grayling and four Arctic char. Ten blackfish were recovered from one pike stomach, and slimy sculpins were observed in the stream. Several of the Arctic char captured on hook and line were feeding on Arctic lampreys.

Gravel in this section was variable in size with about 40% over 2 in, 30% between 1 in and 2 in, 20% less than 1 in and 10% sand and silt. Due to high water level, most gravel bars were not exposed. This section contains excellent spawning habitat for char, grayling and salmon. The Andreafsky River gets good runs of chum, pink and coho salmon and provides spawning grounds for a significant portion of the Yukon River chinook salmon run.

Angling was good for both grayling and char, and is reported to be excellent later in the year. Arctic char were most numerous toward the upper end of the survey area, but grayling were distributed throughout the entire section.

Melozitna River Survey:

The Melozitna River originates in the Slokhenjikh Hills and flows generally southwest for 249 mi, entering the Yukon River at Mile 594 in the vicinity of 64° 46' N 155° 29' W near the town of Ruby. The Melozitna drains 2,700 sq mi and includes as major tributaries Slokhenjikh Creek, the Little Melozitna River, Wolf Creek and Hot Springs Creek. It is a slow-moving river which meanders for most of its length confined to a single channel. In its upper reaches it drains a fairly wide valley containing many small ponds and muskeg swamp. This influence gives the water a tea color, typical of tundra/muskeg systems. About 30 mi below Hot Springs Creek, the river flows through the Melozitna Canyon and for about 15 mi it is confined by the precipitous walls. Throughout the canyon's length, the river is slow-moving except for three rapid areas where most of the system's vertical drop occurs. Below the canyon, the current speeds up for the remainder of the river's length. The upper 150 mi drop only about 1.5 ft per mile, while the lower 80 mi drop an average of 5.8 ft per mile. Within this lower 80 mi stretch, there is a 28 mi segment which drops 11 ft per mile.

The Melozitna River was surveyed by raft from Melozi Hot Springs to the Yukon River from July 21 through July 23, 1980. For survey purposes, the river was devided into three sections. Section I consisted of the lower part of the river from its mouth to Grayling Creek (the lower extremity of Melozitna Canyon). This section is characterized by long sweeping bends and some large gravel bars. Gravel extends to the river mouth. River banks are heavily forested with spruce, cottonwood and willow. The river is about 350 feet wide, with an average depth of about 3 feet and a moderate current throughout this section. No flow measurements were taken. A

25' 1/2" bar measure gill net set overnight below Grayling Creek took five grayling and three chum salmon. The lower mile of Grayling Creek was surveyed on foot. It is a fast, clear mountain stream with little good fish habitat. Grayling were the only species observed in Grayling Creek, although Ruby residents report that Arctic char are sometimes present. Water temperature of Grayling Creek was 7.5°C.

About 6 mi upstream from the Yukon sheefish were observed jumping and from this point the whole lower part of the river contained numerous areas which are suitable for sheefish. One sheefish was captured on hook and line in the lower 1/2 mile of the Melozitna. In past Yukon River work, sheefish have been taken at the mouth of the Melozitna. This area supports a moderate sport fishing effort by Fairbanks, Ruby and Galena residents for sheefish in mid July. Most of the sheefish are probably holding during their upriver migration in the Yukon.

Section II consisted of the Melozitna Canyon area from Grayling Creek on the lower extreme extending 14 mi upstream. This section is characterized by steep canyon walls rising 300 to 500 ft along the riverbanks, confining the river to a narrow channel about 200 ft wide. The river throughout this section is slow-moving except for four areas. Three of the swifter areas are a combination of rapids and falls where the river takes most of its drop in elevation. The first rapids are located at 64° 52' N 155° 29' W as the river takes a sharp bend to the left. These are the worst rapids in the river, but can be navigated by raft in the right channel. The second rapids are located about 1/2 mile below the first and the third about 4 1/2 miles below the second. No sampling was done in this section, but salmon were observed above the canyon area, so these rapids do not present a barrier to all fish movement. Sheefish are probably not able to surmount the rapids.

Section III consisted of the Melozitna River above the canyon. This section was surveyed only as far upstream as Hot Springs Creek, but should extend at least as far upstream as the Little Melozitna River. This section is characterized by many small, meandering bends and a slow current. It is in this section that the river gains its tea-brown color through the influence of muskeg swamp and small marshy lakes. The river is slow moving with an average width of 250 ft. One 125' graduated mesh gill net set overnight in the mouth of Black Sands Creek took 6 grayling, 2 northern pike and 12 chum salmon. Two Arctic char were caught on hook and line in the lower end of Fox Creek and several others were observed. Grayling and chum salmon were also observed in Fox Creek. One Arctic char was also caught at the mouth of a small, unnamed tributary from the west below Fox Creek. Temperature in the Melozitna was 17°C.

Hot Springs Creek, a clear, swift stream is a major tributary of the Melozitna. It averages about 125 ft in width and supports a spawning run of chum salmon. Grayling were numerous and feeding primarily on salmon eggs at the time of our survey. The fish reached 18 in in length and weighed 2 pounds. Evidence of many bears was present in the form of partially devoured salmon carcasses and tracks on all gravel bars. Northern pike were captured at the mouth of Hot Spring Creek.

Biological Aspects:

The Melozitna and Andreafsky Rivers both flow into the Yukon River from the north. Generally they are more mountainous than streams flowing in from the south and have dissimilar fish fauna. In this respect they are more like other mountainous streams flowing into the Yukon River from the north, namely: the Kaltag, Nulato and Anvik Rivers. The Melozitna and Andreafsky represent the upper and lower range of Arctic char in the Yukon River system. A few isolated populations of dwarf-sized Dolly Varden char are present further upstream in the Yukon and Tanana systems. The fish fauna of the Andreafsky River is very similar to that of the Anvik River (Alt, 1980). Char and grayling are the important year-round residents in the upper reaches of the streams, while pike are abundant in the lower reaches. Round whitefish are much less abundant in the Andreafsky than in the Anvik. The Andreafsky has three species of whitefish in addition to round whitefish, but there is no evidence that the river is used for anything more than a feeding stream for broad and humpback whitefish and least cisco. Sheefish are present in the lower reaches. Andreafsky River is an important chinook, chum, coho and pink salmon spawning stream. The Melozitna River, in contrast to the Andreafsky and other streams, contains slow moving, deep, stained water in the upper reaches, and the swifter water near the mouth and in the Melozitna canyon. Thus pike are the most abundant species in the upper river, while grayling become more abundant near the mouth. The mainstem Melozitna River is fish-poor in contrast to other streams. Rather, the clear, swift-flowing tributaries of the Melozitna (e.g. Wolf, Hot Springs, Fox, Black Sands, and Grayling Creeks) have large concentrations of fish. During the July survey Arctic char, grayling and salmon were found mainly in the tributary streams or near tributary mouths. Most salmon spawning occurs in the tributary streams. Sheefish are present in the lower Melozitna but have probably been prevented from reaching the middle Melozitna because of the Melozitna Canyon. It is not known if they spawn in the lower river.

The Melozitna and Andreafsky Rivers are important sport fishing streams. Arctic char, grayling, pike, and chinook, chum, pink and coho salmon are the important species on the Andreafsky; sheefish are the most important on the Melozitna, with char, grayling, pike and chum salmon being less important.

Arctic Char

Melozitna River:

Three Arctic char were captured in the Melozitna River. Two were prespawning females (egg diameter 3.1 mm) while the other was a developing female (egg diameter 1.5 mm). Char were captured only in tributary streams or their mouths and none were observed in the mainstem Melozitna. Melozitna Hot Springs Creek, the largest tributary surveyed, was floated for a distance of 12 mi but no char were observed or captured. This swift, gravely stream contained spawning chum salmon and grayling and appeared to have excellent habitat for char. Some char are probably present but apparently in small numbers as in the other Melozitna tributaries. Most past

records of char captures in the Melozitna River were from Grayling Creek, located 9 miles up from the Melozitna mouth. None were captured or observed there in 1980.

The char in the Melozitna system are considered year-round stream residents. These fish are like the char found in the Anvik, Nulato and other tributary rivers from the Melozitna to the Andreafsky that enter the Yukon River from the north. The Melozitna is the farthest upstream that Arctic char are found in the Yukon River. The char present in small tributary streams farther up the Yukon River are dwarf-size fish and are considered to be Dolly Varden char. Morrow and Armstrong (1980) mention that these dwarf char seldom exceed 300 mm. They did not provide gill raker counts. Gill raker counts of the Melozitna char range from 21-24 total count (Table 3). This is similar to counts of char from lower Yukon River and Kuskokwim River fish. Pyloric caeca counts were 25-32 ($\bar{x}$ = 27.5) (Table 4). Length ranged from 469-491 mm and one fish was Age VI and two were Age IX. Spawning probably occurs in the tributary streams and overwintering probably occurs in deeper holes at the lower end of tributary streams or in the Melozitna River.

Andreafsky River:

Arctic char were abundant in the portion of the Adreafsky River surveyed and were found within 15 mi of the mouth. They are also present in the East Fork Andreafsky River. They were distributed throughout the main river and in tributary streams. They were generally found over a gravel bottom and in areas of fairly fast current and occasionally in sloughs. This is in contrast to the situation in the Anvik River in June 1979 where char were more abundant in sloughs (Alt, 1980). Residents report that char distribution later in the summer parallels salmon spawning distribution.

Gill raker counts of Andreafsky char ranged from 19-24, which are similar to counts of Arctic char in other Yukon River tributary streams (Table 3). Pyloric caeca counts ranged from 25-31 which again are similar to counts from other streams (Table 4). Fifteen char were aged and ranged from Age V to XI (Table 5). Most fish were Ages VI and VII and only two fish over Age IX were found. Growth of Andreafsky River char is similar to growth of char from the Melozitna River and other Yukon River tributary streams. Char from the Andreafsky had various color combinations which were generally related to sexual condition. The three combinations were: 1) silvery color, pale to light pink spots, green dorsal surface, light white color on edges of fins, usually no kype; 2) bright color (silver body with pale to bright orange spots), bright white leading edges of fins, orange to red colors on belly and gills, kype forming, dark color on dorsal surface, general robust condition; 3) dark phase, dark green-brown color, spots red or pale orange. Kype very pronounced, orange to brown on tip, belly dark orange or red - usually very snaky and thin appearance. These three color phases are related generally to immature, prespawning and spent fish from the previous year's spawning, respectively.

Developing fish contained eggs less than 1.8 mm in diameter in mid June, prespawning fish contained eggs of 2.5 mm or more and spent fish had eggs

Table 3. Pyloric caeca counts for Arctic char from Andreafsky and Melozitna Rivers with comparative data from other waters.

Location	n	No. pyloric caeca Mean	Range
Andreafsky River	11	27.5	25-31
Melozitna River	3	28.0	25-32
*Nulato River	4	29.3	24-34
*Anvik River	14	27.0	20-35
**Colville River	27	31.7	25-42

* Alt, 1980
** Winslow and Roguski, 1970

Table 4. Gill raker counts for Arctic char from Andreafsky and Melozitna rivers with comparative data from other Alaskan waters.

Location	n	Gill Raker in Lower Limb $\bar{x}$	Gill Raker in Lower Limb Range	Total count $\bar{x}$	Total count Range
Andreafsky River	14	12.3	10-14	21.4	19-24
Melozitna River	3	13.3	13-14	22.6	22-24
*Anvik River	15	12.6	11-14	21.9	20-24
*Nulato River	5	12.8	11-14	22.0	20-24
*Kanektok River	10	13.0	12-14	21.9	20-24
**Colville River	28	12.3	11-13	22.9	21-25

* Alt, 1980
** Winslow and Roguski, 1970

Table 5. Length, weight, and age relationships for Arctic char from Andreafsky and Melozitna rivers.

		Age						
Andreafsky River n=15		V	VI	VII	VIII	IX	X	XI
Length mm								
	$\bar{x}$	412	409	420	459	512		430
	n	1	5	5	2	1		1
	range	412	318-451	366-460	448-460	512		430
Weight g								
	$\bar{x}$	600	543	485	850	1100		500
	n	1	4	5	2	1		1
	range	600	225-900	325-650	700-1000	1100		500
Melozitna River n=3								
Length mm								
	$\bar{x}$		470			480		
	n		1			2		
	range		470			469-491		
Weight g								
	$\bar{x}$		950			888		
	n		1			2		
	range		950			725-1050		

less than 1.8 mm in diameter. Spent fish contained some retained eggs. It was difficult to tell if spent fish would redevelop and spawn in the current year, but based on the very poor condition of the fish in June, probably not.

Andreafsky char are year-round stream residents in the Andreafsky and very seldom enter the Yukon River. Local residents mention capturing an occasional char in the lower Andreafsky River, especially in winter and spring.

Northern Pike

Melozitna River:

Northern pike are widely distributed in the upper Melozitna River upstream of the area surveyed (Joe Webb, BLM, pers. comm.). We captured them at the mouth of Hot Springs Creek and at the mouth of Black Sands Creek. None were taken in the relatively swift water of the Melozitna Canyon. We had taken them at the mouth of the Melozitna in previous years but none were captured during the present survey. Thus, pike abundance in the section surveyed could be considered low. The four pike measured were 600-665 mm and ranged in Age from VI-VIII (Table 6). No younger pike were observed or captured. All pike were mature and all had empty stomachs.

Andreafsky River:

Pike were distributed throughout the area surveyed but were more abundant in the lower reaches of the Andreafsky. This region had slower moving water and a greater abundance of sloughs. Pike ranged in size from 128 mm to 908 mm (Table 6). Ages I thru XII were represented and Age III had the greatest number of individuals represented. Growth of Andreafsky pike is similar to that of pike from the Anvik River and other lower Yukon River streams (Alt, 1980). All fish over Age IV were mature. The larger size fish are females and all fish over 547 mm were females.

Major food items eaten were blackfish, sculpins, lampreys, whitefish and salmon fry. Eight of 17 stomachs were empty.

Grayling

Melozitna River:

Grayling have a very unusual distribution pattern in the Melozitna River. They were widely distributed and quite abundant in Melozi Hot Springs Creek and then were captured only in tributary streams and their immediate mouths from Melozi Hot Springs Creek to the mouth. Very few grayling were observed or captured in the main Melozitna River. The Melozitna generally had a sand and gravel bottom over much of this area but the water color was slightly stained and current speed was slow. However, more grayling were anticipated in the main Melozitna. Joe Webb (BLM, pers. comm.), floated the upper Melozitna River during summer and found very few grayling. The upper river is very slow and more suitable for pike. Grayling sampled ranged from 122 to 379 mm and in Age from I to IX (Table 7). No fish of

Table 6. Length, weight, and age relationships for northern pike, Andreafsky and Melozitna rivers.

		Age										
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Andreafsky River													
n=18													
Length mm													
	$\bar{x}$	128		371	390	455	495	575	598				803
	n	1		5	2	1	2	2	3				3
	range	128		340-430	360-430	455	455-535	574-575	547-689				702-908
Weight g													
	$\bar{x}$	300		395	450	700	925	1425	1600				3667
	n	1		5	2	1	2	2	3				3
	range	300		300-600	400-500	700	800-1050	1400-1450	1200-2500				2500-4300
Melozitna River													
n=3													
Length mm													
	$\bar{x}$						606	600	650				
	n						1	1	2				
	range						606	600	635-665				
Weight g													
	$\bar{x}$						1500	1625	2100				
	n						1	1	2				
	range						1500	1625	2000-2200				

Table 7. Length, weight, and age relationship for grayling, Andreafsky and Melozitna rivers.

Andreafsky River

		Age								
Length mm		I	II	III	IV	V	VI	VII	VIII	IX
	$\bar{x}$	116	154	220	272	295	370	389	393	392
	n	1	2	6	3	3	4	9	4	2
	range	116	152-156	206-238	265-283	283-320	336-425	349-419	368-411	378-406
Weight g										
	$\bar{x}$			97	168	240	459	517	586	550
	n			6	3	3	4	9	4	1
	range			80-100	150-200	200-320	360-650	450-750	475-700	550

Melozitna River

Length mm								
	$\bar{x}$	122		286	286	345	322	360
	n	5		1	7	1	4	3
	range	119-126		286	245-326	345	297-335	320-379
Weight g								
	$\bar{x}$			225	214	500	355	442
	n			1	7	1	4	3
	range			225	175-400	500	250-400	300-525

Ages II and III were captured. The largest grayling caught weighed 525 g. The grayling of Melozi Hot Springs Creek were slightly larger than those of the main Melozitna, but none were sampled. Grayling from the Melozitna River apparently grow slower than grayling from the Andreafsky and Anvik Rivers after Age IV. Grayling sampled were mature at Age V for males and greater than Age V for females. All fish were feeding; insects (mainly diptera larvae, beetles, caddis flies and stoneflies), salmon eggs, fish remains, salmon flesh, ants, copepods and a vole were food items.

Andreafsky River:

Grayling were widely distributed in the upper section of the Andreafsky River surveyed and within 10 mi of the mouth. They are reportedly very abundant farther up the main Andreafsky and throughout the entire East Fork Andreafsky River. They are also present in tributary streams. Few grayling were captured in gill nets, but considerable numbers were captured on hook and line. Andreafsky grayling grew slightly larger than Melozitna grayling, and a 406 mm fish was captured. Local residents of St. Marys said that larger fish are present in the river. Andreafsky fish captured were 116 to 406 mm and ranged in Age from I to IX (Table 7). Fish from Ages VI through IX all averaged over 1 lb in weight. Grayling had completed spawning at the time of our survey and were in a redeveloping state. All fish under Age VI were immature and those Age VI and older were mature. All grayling had been feeding and caddis flies were the main food item. Diptera larvae, beetles, stoneflies, mayflies, snails, sculpins, fish eggs and fish remains were also found.

Round Whitefish

Only one round whitefish was captured in the Melozitna River. It was an Age I, 137 mm fish. Joe Webb (BLM, pers. comm.) did not encounter round whitefish during a 249 mi float survey of the Melozitna. In the Andreafsky River, eleven round whitefish were taken by seine. They were 178 to 288 mm in length, ranged in Age from II to IV, and all were immature.

Humpback Whitefish

No humpback whitefish were captured in the Melozitna river during the present survey although I have captured them at the mouth of the Melozitna in previous years. Six humpback whitefish were captured in the Andreafsky River in gill nets set 6 mi upriver. The fish were 390-493 mm and ranged in Age from VII to X. All were prespawners and five of the six fish were males. Fish were eating mainly snails. Since no smaller size fish were taken it appears that the Andreafsky River serves as a feeding and possibly spawning stream.

Broad Whitefish

No broad whitefish were captured during the Melozitna River survey but I have taken them at the mouth of the river in previous years. Four broad whitefish 326-450 mm in length were taken in the lower Andreafsky River but none farther upstream. The four fish included Ages IV and V developing

males and Ages VII and IX nonconsecutive spawning females. Fish were feeding on clams snails, caddis flies and diptera larvae.

Least Cisco

Least cisco have not been captured in the Melozitna River. One 296 mm least cisco was taken in a gill net in lower Andreafsky. This 6-year-old fish was immature.

Other Species

Sheefish were taken in the lower Melozitna and their biological data is reported elsewhere (Alt, 1981). They have occasionally been reported in the lower Andreafsky but none were taken during our survey. Burbot are probably present in both streams but none were captured. Chinook and chum salmon are both present in the Melozitna River although chums are much more abundant. They were observed spawning in July in Melozi Hot Springs Creek, Black Sands Creek, Grayling Creek, Fox Creek and the main Melozitna River. Chinook, chum and pink salmon all are quite abundant in the Andreafsky and coho salmon probably also enter the stream. Suckers were not found in either stream.

Fish/Niukluk System - Seward Peninsula Survey

Investigations were conducted on the Fish/Niukluk River system from June 21 through June 24, 1980. The Niukluk River was high and slightly turbid from spring runoff, but was dropping and clearing slightly throughout the period of the survey. Water temperature in the Niukluk and tributaries varied from 4.5 to 7°C. Most of the turbidity in the Niukluk originated from Libby River. Stream bed gravel composition was determined and current speeds were taken. Nets set near the mouths of two Niukluk tributaries took grayling, round whitefish and Arctic char. One Arctic char and many grayling were captured on hook and line. Grayling were feeding heavily on caddis fly larvae and their spawning had occurred only a few days prior to the survey. Most of the Arctic char in the Niukluk had already left, as only two were seen or captured.

Wulik-Kivalina River Spawning Ground Counts

Grayling Creek:

In 1980, 226 redds were counted while walking Grayling Creek on August 12 and 16. The best count was obtained on August 16 when calm water allowed us to see redds in the deeper water. In addition 57 Arctic char were counted in the vicinity of the redds. Some of these char may have been involved in redd digging. We obviously missed some redds and a considerable number of fish because of windy conditions and deep water. On September 12, 244 char were aerially counted on Grayling Creek under good survey conditions. This could mean that our original survey in August missed quite a few fish or that new fish had entered the stream in early September. The latter is more probable since in past years most spawners had completed spawning and left Grayling Creek by late August. The large

number of char observed on September 12 indicates that the spawning season lasts from late July through September.

On August 23, 1976 it was estimated that 90% of the char had left Grayling Creek and fewer than 30 char were observed on redds (Alt, 1978). During a float trip in 1976 Alt (1978), counted nearly 600 redds under fair conditions on August 24 and 25.

In 1977 on August 20 and 21, 633 spawning redds were counted under excellent conditions and about 200 char were counted in the vicinity of the redds (Alt, 1978). We estimated that there were approximately 700 redds present. The spawning ratio was calculated at three females per male.

In 1978 Grayling Creek char were not counted, but Phil Driver (pers. comm.) indicated that there were fewer char in Grayling Creek and other traditional spawning grounds than in 1977.

In 1979 Grayling Creek char redds were not counted because of extremely high water from August 16-20. Phil Driver (pers. comm.) said that there were hardly any char spawning in Grayling Creek and that fishermen had caught very few on hook and line. He estimated that only 50 fish had spawned in Grayling Creek through late August.

Thus it appears that the 1980 spawning population in Grayling Creek was considerably higher than 1979 but still much lower than the 1977 count. Of course, the 1977 char spawning population may have been at historically high levels. Another possibility to account for the low number of spawners would be stream interchange.

In 1980 no estimates of char spawning in the main Kivalina River, Five Finger Creek or Baqhalik are available because of poor survey conditions. Approximately 200 char were observed 4.5 mi up the North Fork Kivalina River (Little River) on September 12.

Wulik River:

In 1980 no char spawned in the vicinity of the Wulik River Forks because of naturally occurring channel changes, but large numbers of char were spawning from 1/8 mi below the forks to 3 mi downstream and then from four mi to 10 mi downstream. Approximately 383 redds and 200 fish were observed on August 15. During a late September count, at least an additional 100 redds were counted. Phil Driver (pers. comm.) counted 30 spawning char up the West Fork of the Wulik River and we counted 44 char on Sheep Creek and 87 on the main fork Wulik River below Sheep Creek. Additionally a small number of spawning char were located in the middle sections of Ikalukrok Creek in August.

Water conditions in the Wulik and Kivalina systems in 1977, 1978 and 1980 were considered normal or low while in 1979 they were high all summer.

Overwintering Char Aerial Surveys

An aerial survey of overwintering fish in the Wulik River was flown on October 4, 1979 under poor conditions and 55,030 char counted. On the Kivalina River 15,744 were counted. It was estimated that 40% were counted on each stream. Expanded population counts were 137,545 for the Wulik River and 39,360 for the Kivalina River. Aerial counts under very good conditions on September 23, 1980 gave 113,553 for the Wulik River and 39,692 for the Kivalina River. Assuming that 90% of the Wulik River char were counted in 1980, then counts were similar to 1979 (137,545 in 1979 and 124,908 in 1980). The expanded 1980 Kivalina count of 43,661 fish is similar to the 1979 expanded count of 39,360 fish.

Northwest Alaska Char Study

An Arctic char study was initiated on the Wulik-Kivalina, Noatak and Kobuk Rivers in 1980, with major emphasis on the Noatak. Aerial surveys were done on some streams known to support Arctic char spawning and a small number of Arctic char were tagged. Knowledge was gained as to the feasibility of using the Department's float plane to augment work in the area for the next few years. Aerial estimates of numbers of Arctic char spawners were made on several Noatak tributaries in late August. A total of 4,617 spawning Arctic char was observed as follows:

River	Estimated # of Spawners
Avan River	300
Wrench Creek	1,200
No Name Creek	99
Kelly River	1,100
Seagull Creek	1,100
Tumit Creek	800
Anisak River	18
Total	4,617

Arctic char are also known to spawn in the following streams: Eli River, Nunaviksak Creek, Kavik Creek, Trail Creek, Kaluktavik River, Nimiuktuk River and Kugururok River.

Ninety-eight Arctic char were tagged in Kelly River and in Wrench Creek during August. The Squirrel River was surveyed in late August, and a major tributary, the Omar River, was floated in early September. Forty char were observed, of which five were captured and tagged.

More extensive work in the Noatak system is scheduled for 1981-1984 to better understand the life history of Arctic char in this region.

Arctic Char Utilization in Northwestern Alaska

The major use of Arctic char in the Kotzebue area is for subsistence. It is estimated that the annual subsistence harvest in Kivalina averages about 30,000 char. Most of these are seined in overwintering grounds on the Wulik River. Some are also taken by gill net near the village and, depending on weather conditions, some are taken through the ice in mid

winter. Seining also takes place on the Noatak River by residents of Noatak and Kotzebue. There is also an ongoing ice fishery for Arctic char by Noatak residents, usually in the immediate vicinity of their village. We have no estimate of harvest levels in this area. Arctic char are taken incidentally to the commercial salmon fishery in Kotzebue Sound. Most of these char are used by the fisherman's family, although some are sold to commercial fish buyers. During the 1980 commercial fishing season a total of 2,867 char was sold to the Kotzebue area fish buyers.

In addition to subsistence use, there is a sport fishery for Arctic char which takes place primarily on the Wulik-Kivalina Rivers and the Noatak River. On the Noatak River sport fishing pressure is from several sources. Kotzebue residents fly in or boat up to Noatak tributary streams throughout the summer, especially to the Kelly River. River floaters angle as they float and often camp near tributary streams in which they sport fish. There is also at least one guide who brings a few anglers into the Noatak for fishing.

Kotzebue residents and visitors fly into the Wulik River to sport fish for Arctic char in the fall. There has apparently been no significant increase in angling pressure on this river in the past 10 years. There is one guide camp located on the Wulik River and small groups of anglers associated with this camp fish the Wulik, Kivalina and some Noatak tributaries periodically throughout the summer. The number of char killed in the sport fishery is insignificant compared to the thousands taken for subsistence in the area.

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